

## IN THE CLAIMS

Please ADD new claims 105-121, as follows. Note that all the claims currently pending in this application, including those not currently being amended, have been reproduced below for the Examiner's convenience.

1-44. (Cancelled)

45. (Previously Presented) An exposure apparatus comprising:

an illumination optical system for illuminating a mask with light from a light source;

a projection optical system for projecting a pattern of the mask being illuminated, said projection optical system having a plurality of optical elements; and

gas supplying means for locally supplying a gas to a predetermined surface of one of said optical elements, which is closest to an image plane, the predetermined surface being a surface facing the image plane, wherein said gas supplying means has a surface outlet port which is inclined with respect to the image plane so that the gas outlet port faces toward the predetermined surface of the one optical element rather than to the image plane.

46. (Previously Presented) An apparatus according to Claim 45, further comprising a container for accommodating the optical elements within a space being isolated from a surrounding ambience.

47. (Previously Presented) An apparatus according to Claim 46, further comprising a cover, disposed at the predetermined surface side of said container, for suppressing diffusion of the gas supplied by said gas supplying means to the one optical element.

48. (Previously Presented) An apparatus according to Claim 47, wherein said gas supplying means includes a plurality of gas supplying ports provided inside said cover and disposed revolutionally symmetrically with respect to an optical axis of said projection optical system.

49. (Previously Presented) An apparatus according to Claim 45, further comprising adjusting means for adjusting a gas supplying flow rate and a gas supplying pressure in accordance with the state of use of said exposure apparatus.

50. (Previously Presented) An apparatus according to Claim 45, further comprising temperature adjusting means for adjusting a temperature of the gas supplied from said gas supplying means.

51. (Previously Presented) An apparatus according to Claim 50, wherein said gas supplying means includes a plurality of gas supplying ports provided inside said cover and disposed revolutionally symmetrically with respect to an optical axis of said projection optical system.

52. (Previously Presented) A device manufacturing method, comprising the steps of:  
exposing a workpiece with a pattern by use of an exposure apparatus as recited in  
Claim 45; and  
developing the exposed workpiece.

53-76. (Cancelled)

77. (Previously Presented) An optical apparatus comprising:  
an optical element; and  
means for producing a laminar flow of a gas, locally flowing to a surface of the  
optical element.

78. (Previously Presented) An apparatus according to Claim 77, further comprising a  
light source for providing light having a wavelength in an ultraviolet region.

79. (Previously Presented) An apparatus according to Claim 77, wherein said apparatus  
is to be used with light having a wavelength in an ultraviolet region, and wherein said apparatus  
further comprises (i) an ultraviolet optical system accommodated in a container, being isolated  
from a surrounding ambience, and (ii) gas supplying means provided outside an optical element  
which is disposed at one of an ultraviolet-ray entrance opening and an ultraviolet-ray exit  
opening of said container, said gas supplying means being arranged to produce a laminar gas

flow, flowing to a surface of the optical element, thereby to locally supply a gas to the surface of the optical element.

80. (Previously Presented) An apparatus according to Claim 77, further comprising (i) means for locally supplying a gas to the surface of the optical element, and (ii) gas discharging means for exhausting the gas supplied by said gas supplying means.

81. (Previously Presented) An apparatus according to Claim 77, further comprising a plurality of gas supplying means each being arranged to produce a laminar gas flow, flowing to the surface of the optical element, thereby to locally supply a gas to the surface of the optical element, wherein said plurality of gas supplying means are disposed rotationally symmetrically with respect to an optical axis of the optical element.

82. (Previously Presented) An apparatus according to Claim 77, further comprising (i) a plurality of gas supplying means each being arranged to produce a laminar gas flow, flowing to the surface of the optical element, thereby to locally supply a gas to the surface of the optical element, and (ii) a plurality of gas discharging means for exhausting the gas supplied by said gas supplying means, wherein said plurality of gas supplying means are disposed rotationally symmetrically with respect to an optical axis of the optical element, and wherein said plurality of gas discharging means are disposed rotationally symmetrically with respect to the optical axis of the optical element.

83. (Previously Presented) An apparatus according to Claim 80, wherein said gas supplying means is disposed at one side of a side face of the optical element, and wherein said gas discharging means is disposed at the other side of the optical element.

84. (Previously Presented) An apparatus according to Claim 77, further comprising a cover member for reducing diffusion of the gas locally supplied to the surface of the optical element.

85. (Previously Presented) An apparatus according to Claim 77, further comprising means for removing an impurity contained in the gas locally supplied to the surface of the optical element.

86. (Previously Presented) An apparatus according to Claim 77, further comprising gas supplying means having means for removing an impurity contained in the gas.

87. (Previously Presented) An apparatus according to Claim 77, wherein the gas is an inactive gas.

88. (Previously Presented) An apparatus according to Claim 77, wherein the gas is an atmospheric gas, and wherein said apparatus further comprises means for removing an impurity contained in the gas.

89. (Previously Presented) An apparatus according to Claim 77, further comprising (i) gas supplying means and (ii) adjusting means for adjusting a gas supplying flow rate and a gas supplying pressure of said gas supplying means in accordance with the state of operation of said optical apparatus.

90. (Previously Presented) An apparatus according to Claim 77, further comprising (i) gas discharging means and (ii) adjusting means for adjusting a gas exhausting flow rate and a gas exhausting pressure of said gas discharging means in accordance with the state of operation of said optical apparatus.

91. (Previously Presented) An apparatus according to Claim 77, further comprising (i) gas supplying means and (ii) a temperature adjusting means unit for the gas supplied or to be supplied by said gas supplying means.

92. (Previously Presented) An apparatus according to Claim 77, wherein said optical apparatus is an exposure apparatus.

93. (Previously Presented) An apparatus according to Claim 77, wherein said optical apparatus is an exposure apparatus, and wherein said exposure apparatus includes a projection optical system and gas supplying means provided in association with an optical element of said projection optical system, which optical element is disposed opposed to a wafer.

94. (Previously Presented) A device manufacturing method, comprising the steps of:

exposing a workpiece by use of an optical apparatus as recited in Claim 92; and  
developing the exposed workpiece.

95. (Previously Presented) A contamination preventing method for an optical apparatus,  
said method comprising:

producing a local laminar flow of a gas, flowing to a surface of an optical element  
of the optical apparatus, thereby to prevent contamination of the optical element.

96. (Previously Presented) A method according to Claim 95, wherein the optical  
apparatus includes a light source of ultraviolet rays.

97. (Previously Presented) A method according to Claim 96, wherein the optical  
apparatus to be used with the ultraviolet rays includes an optical system accommodated in a  
container and having an optical element disposed at one of an ultraviolet-ray entrance opening  
and an ultraviolet-ray exit opening of the container, and wherein a laminar gas flow, flowing to  
the surface of the optical element, which surface faces to a surrounding ambience, is produced  
thereby to locally supply a gas to the surface of the optical element and to prevent contamination  
of the optical element.

98. (Previously Presented) A method according to Claim 95, further comprising  
adjusting at least one of (i) a gas supplying flow rate and a gas supplying pressure of gas

supplying means and (ii) a gas exhausting flow rate and a gas exhausting pressure of gas discharging means in accordance with the state of operation of the optical apparatus.

99. (Previously Presented) A method according to Claim 95, further comprising removing an impurity contained in the gas by impurity removing means, and supplying the impurity-removed gas to the surface of the optical element.

100. (Previously Presented) A method according to Claim 95, wherein the optical apparatus is an exposure apparatus.

101. (Previously Presented) A method according to Claim 95, wherein the optical apparatus is an exposure apparatus having a projection optical system, and further comprising causing a laminar gas flow to locally flow to the surface of an optical element of the projection optical system, facing a wafer.

102. (Previously Presented) An exposure method, comprising:  
exposing a wafer with a pattern, while avoiding contamination of an optical element in accordance with a method as recited in Claim 95.

103. (Previously Presented) An exposure apparatus arranged to perform an exposure operation in accordance with an exposure method as recited in Claim 102.



104. (Previously Presented) A device manufacturing method, comprising the steps of:

exposing a wafer in accordance with an exposure method as recited in Claim 102;

and

developing the exposed wafer.

105. (New) An exposure apparatus comprising:

a projection optical system, having a plurality of optical elements, for projecting a pattern onto a predetermined plane;

a barrel for accommodating said plurality of optical elements;

gas supplying means disposed between the predetermined plane and a final optical element, which is one of said plurality of optical elements that is closest to the predetermined plane, said final optical element being placed at a position of an opening formed in a portion of said barrel, which portion is closest to the predetermined plane, said gas supplying means supplying a gas from one side of said projection optical system; and

gas exhaust means disposed at the other side, opposite to the one side, for exhausting the gas,

wherein said gas supplying means has a plurality of gas supply ports and said gas exhaust means has a plurality of gas exhausting ports.

106. (New) An apparatus according to Claim 105, wherein said plurality of gas supply ports supply gases to a surface of the final optical element, which surface faces the predetermined plane, and wherein the supplied gases are exhausted through said plurality of gas exhaust ports.

107. (New) An apparatus according to Claim 105, wherein gases are supplied from said plurality of gas supply ports to a surface of the final optical element, which surface faces the predetermined plane while the supplied gases are exhausted through said plurality of gas exhaust ports, whereby a local laminar gas flow is supplied to the surface of the final optical element, facing the predetermined plane.

108. (New) An apparatus according to Claim 105, further comprising a cover member provided at the side of the final optical element, facing the predetermined plane, for covering a light path of said projection optical system, wherein said plurality of gas supply ports and said plurality of gas exhaust ports are provided in said cover member.

109. (New) An apparatus according to Claim 105, further comprising chamber gas supplying means for supplying a chamber gas into said barrel, wherein the chamber gas and the gas supplied by said gas supplying means are of the same type.

110. (New) An apparatus according to Claim 105, wherein the gas supplied by said gas supplying means is an inactive gas.

111. (New) An apparatus according to Claim 110, wherein the inactive gas is nitrogen or helium.

112. (New) An apparatus according to Claim 105, further comprising impurity removing means, wherein the supplied gas is an atmosphere and wherein any impurities are removed by said impurity removing means.

113. (New) An apparatus according to Claim 105, further comprising means for removing impurities contained in a gas locally supplied to the surface of an optical element by said gas supplying means.

114. (New) An apparatus according to Claim 105, wherein the gas supplied by said gas supplying means is fed from gas supplying equipment having impurity removing means.

115. (New) An apparatus according to Claim 105, further comprising means for adjusting a flow rate and a pressure of the gas supplied or to be supplied from said gas supplying means, in accordance with the state of operation of said exposure apparatus.

116. (New) An apparatus according to Claim 105, further comprising means for adjusting a flow rate and a pressure of the gas exhausted, or to be exhausted, through said gas exhausting means, in accordance with the state of operation of said exposure apparatus.

117. (New) An apparatus according to Claim 105, further comprising a temperature adjusting function for adjusting a temperature of the gas supplied or to be supplied from said gas supplying means.

118. (New) An apparatus according to Claim 105, wherein said exposure apparatus uses light in an ultraviolet wavelength region.

119. (New) An apparatus according to Claim 105, wherein said plurality of gas supply ports and said plurality of gas exhaust ports are disposed in a direction approximately parallel to the predetermined plane.

120. (New) An apparatus according to Claim 105, wherein the final optical element is an optical element to be opposed to a wafer, placed on the predetermined plane of said projection optical system.

121. (New) A device manufacturing method, comprising the steps of:

exposing a wafer using an exposure apparatus as recited in Claim 105; and  
developing the exposed wafer.